Ecological Site Description ID:	F232XY201AK

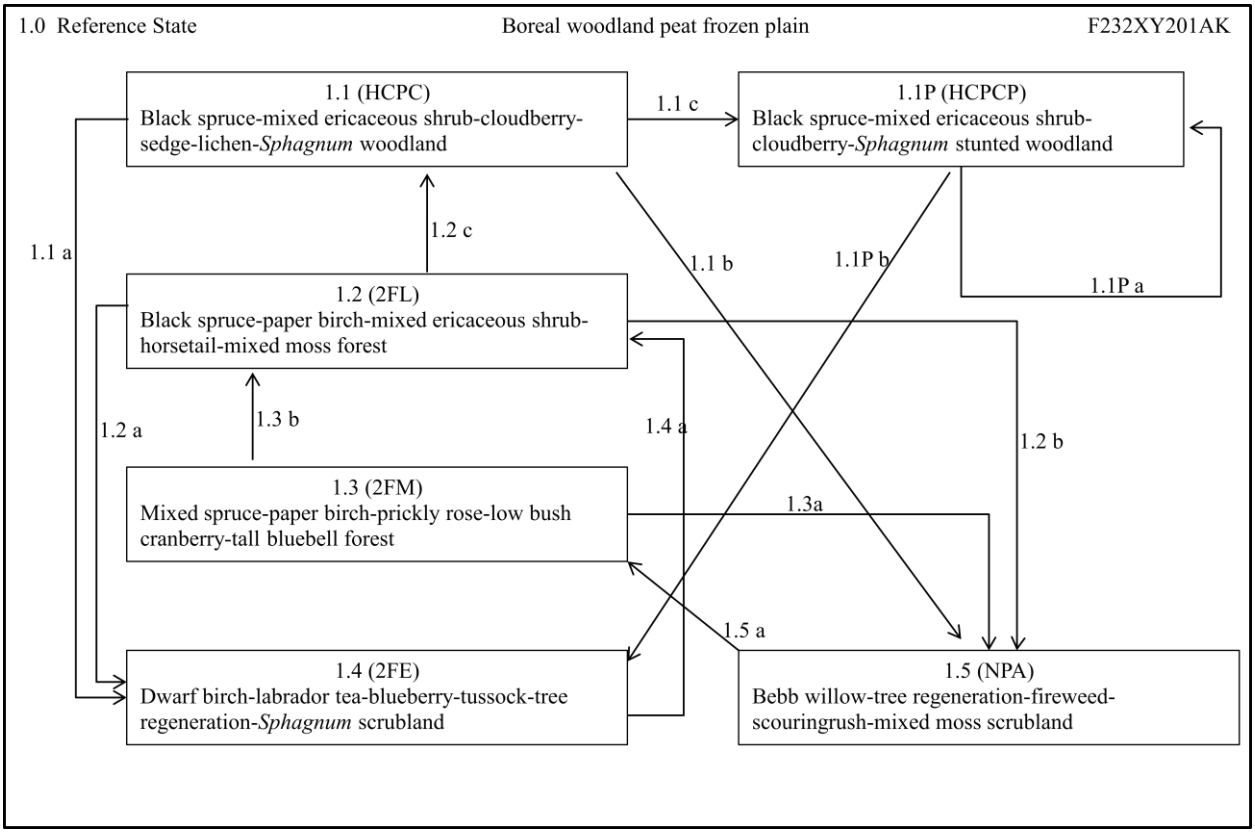
Ecological Dynamics of the Site:

This boreal ecological site occurs on loess plains and encompasses all positions not related to thermokarst or drainages. Average slope was 4% for sampled locations but slope ranged from 0-18%. As time elapses after a fire event and plant communities progress from community phase 1.5 to 1.1, surface organic matter increases and permafrost develops and/or rises in the soil profile. For community phase 1.1, soils were classified as fibristels and were composed of organic matter over silty cryoturbate.

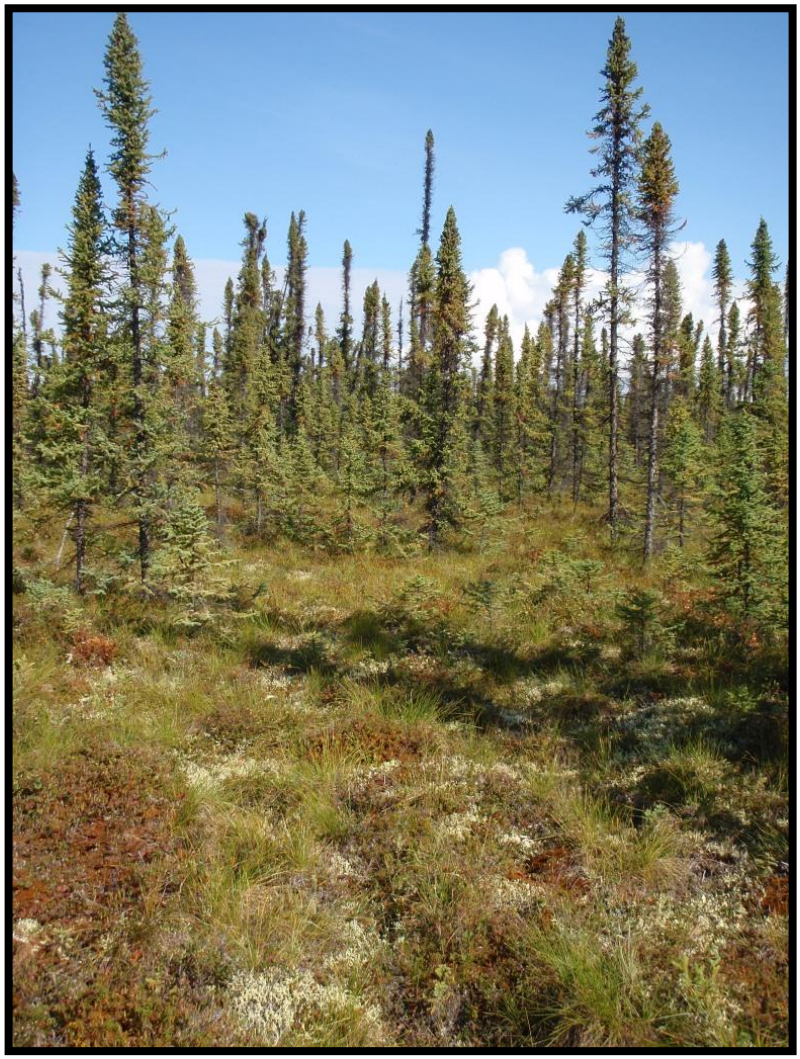
Fire was a disturbance regime that resulted in 6 documented community phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. For this ecological site, low-severity fire events are more typical then high-severity fire events. Low-severity (phase 1.4) and high-severity fire (1.5) community phases appear to differ in the depth of organic material on the soil surface, presence and/or depth of permafrost, present vegetation, and potential vegetation.

It was presumed that sites void of fire for long stretches of time eventually become dominated by *Sphagnum* moss mats. Organic material becomes so thick and has enough moisture so that a fire event would not necessarily reset the community to an early fire sere (i.e. phase 1.4). Sampled communities dominated by *Sphagnum* mats have a less productive black spruce forest and as a result were considered post-climax for this ecological site.

State and Transition Diagram:



State ID Number:	1	State Name:	Reference
State Narrative:	Phases within the reference state were grouped on the structure and dominance of deciduous and coniferous trees which was believed to directly relate to severity of burn and time since last fire event. In a low-severity fire (phase 1.4), minimal proportions of the organic mat are consumed and mineral soils will typically not be exposed. Permafrost typically remains in the soil profile, which often perches water. Graminoids and scrubs quickly recolonize and dominate a site using below ground root reserves that were not consumed in the fire event. Due to their semi-serotenous cones, black spruce quickly reestablishes after fire events. With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2. In a high-severity fire (phase 1.5), large proportions of the organic mat are consumed and mineral soils will typically be exposed. Permafrost often drops out of the soil profile and the sites become drier. While many pre-fire species likely regenerate as mentioned above, conditions are suitable for the establishment and growth of species with wind-blown seed (e.g. paper birch, fireweed, willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.3. The fire return interval plays a large role in the structure of the observed forest. Longer fire return intervals favors development of community phases 1.1 and 1.1P, while shorter fire return intervals favor development of community phases 1.2 and 1.3. Tall trees are defined as trees growing >40’ in height, medium trees are defined as growing 15-40’ in height, while stunted and regenerative trees are defined as growing less than 15’ in height. Tall shrubs are defined to grow greater than 10’ in height, medium shrubs are defined to grow 3-10’ in height, low shrubs are defined to grow 8” – 3’ in height, and dwarf shrubs are defined to grow less than 8” in height.		

Photo 1.1	

Community Phase Number:	1.1	Community Phase Name:	Black spruce-mixed ericaceous shrub-cloudberry-sedge-lichen-moss woodland

Community Phase Narrative:

Picea mariana is the dominant tree species and cover was split between medium, stunted, and regenerative tree stratums (total mature tree cover ~20%; average age 124). *Betula neoalaskana* was occasionally observed but as a trace species. Shrub cover primarily occurred in the low and dwarf stratums (total shrub cover ~70%) and species commonly observed are *Vaccinium uliginosum*, *Ledum palustre* ssp. *decumbens*, *Vaccinium vitis-idaea*, and *Rubus chamaemorus*. Graminoids were generally abundant (~30% cover) and species commonly observed were *Carex bigelowii* and *Eriophorum vaginatum*. Lichen (30%) and moss (30%) formed an extensive ground cover. Commonly observed species include *Flavocetraria cucullata*, *Cladina sp*., *Cladonia sp*., *Sphagnum sp*., and *Hylocomium splendens*. This phase had 9 observations.

Community Pathways	
Pathway Number	Pathway Name & Description

1.1a	Low-severity fire.
1.1b	High-severity fire.
1.1c	Normal time and growth without fire. Black spruce forest becomes less productive and *Sphagnum* moss cover increases. Phase 1.1 has is thought to have a shorter fire return interval then phase 1.1 p and a longer fire return interval then phase 1.2.

Photo 1.1P			
Community Phase Number:	1.1P	Community Phase Name:	Black spruce-mixed ericaceous shrub-cloudberry-*Sphagnum* stunted woodland
Community Phase Narrative:			
When compared to community phase 1.1, phase 1.1P has increased *Sphagnum* moss cover, reduced size and cover of *Picea mariana*, and greater organic mat depth (i.e. average depth 70 cm vs. 40 cm). *Picea mariana* is the dominant tree species and cover primarily occurred in the stunted tree stratum (total mature tree cover ~15%; average age 108). Shrub cover primarily occurs in the low and dwarf shrub stratums (total shrub cover ~60%) and species commonly observed are *Vaccinium uliginosum*, *Chamaedaphne calyculata*, *Ledum palustre* ssp. *decumbens*, *Rubus chamaemorus*, *Vaccinium vitis-idaea*, and *Vaccinium oxycoccos*. Graminoids and forbs are minor vegetative components (<10% cover). Lichen (~20%) and *Sphagnum* sp. (~65%) form an extensive ground cover. This phase had 3 observations.			

Community Pathways

Pathway Number	Pathway Name & Description
1.1Pa	Low-severity fire. Fire lowers black spruce cover but does not dramatically alter vegetative community.
1.1Pb	High-severity fire. Fire may remove significant portion of *Sphagnum* mat reverting system back to typical early fire sere.

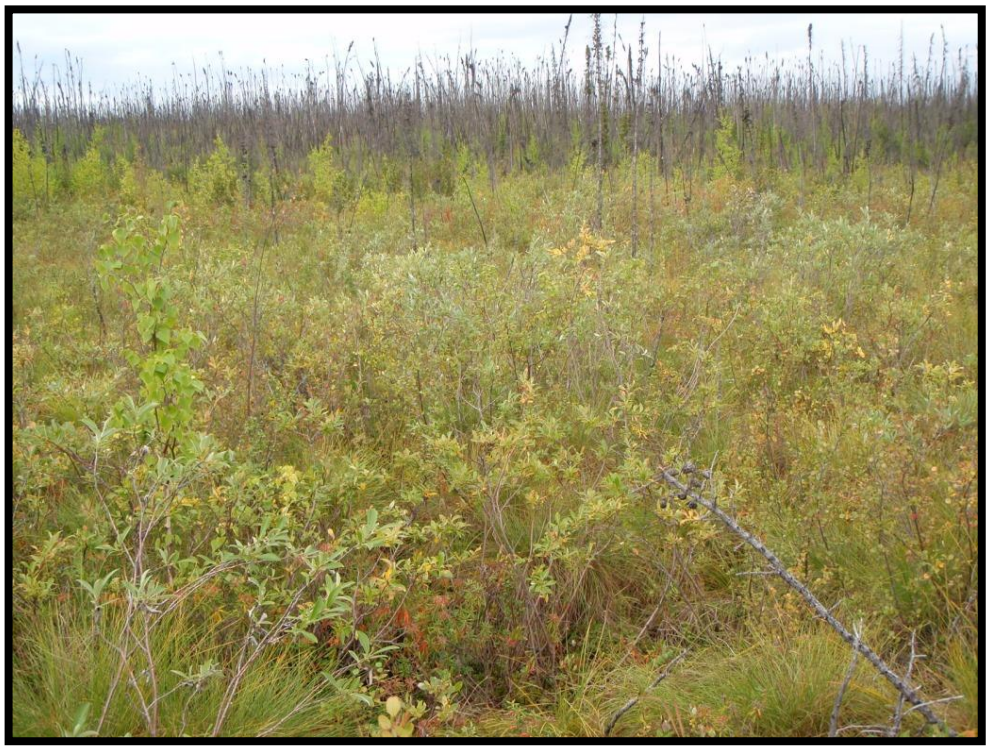
Photo 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Black spruce-paper birch-mixed ericaceous shrub-horsetail-mixed moss forest
Community Phase Narrative:			
Picea mariana is the dominant tree species with *Betula neoalaskana* occurring at lower densities. Tree cover primarily occurs in the medium tree stratum (total mature tree cover ~40%; average age 80). Shrub cover primarily occurs in the low shrub stratum (total shrub cover ~100%) and species commonly observed are *Alnus viridis* ssp. *fruticosa*, *Vaccinium uliginosum*, *Ledum groenlandicum*, *Rosa acicularis*, *Dasiphora fruticosa*, and *Vaccinium vitis-idaea*. Graminoids (~15%) and forbs (~20%) were abundant and species commonly observed included *Eriophorum vaginatum*, *Carex bigelowii*, and *Equisetum sylvaticum*. Lichen (20%) and moss (50%) formed an extensive ground cover and the most commonly observed species are *Cladina sp*., *Cladonia sp*., *Sphagnum sp*., *Hylocomium splendens*, and *Pleurozium schreberi*. This phase had 13 observations.			

Community Pathways

Pathway Number	Pathway Name & Description
1.2a	Low-severity fire.
1.2b	High-severity fire.
1.2c	Normal time and growth without fire. Paper birch falls out of community, black spruce mature, and overall shrub cover decreases. Phase 1.2 is thought to have a shorter fire return interval then phase 1.1 and a longer fire return interval then phase 1.4.

Photo 1.3			
Community Phase Number:	1.3	Community Phase Name:	Mixed spruce-paper birch-prickly rose-low bush cranberry-tall bluebell forest
Community Phase Narrative:			
Betula neoalaskana was the dominant tree species with *Picea mariana* and *Picea glauca* occurring at lower densities. Tree cover primarily occurs in the tall and medium tree stratum (total mature tree cover ~105%; average age 63). Shrub cover primarily occurs in the tall and medium stratums (total shrub cover ~50%) and commonly observed species include *Salix bebbiana*, *Rosa acicularis*, *Ribes triste*, *Vaccinium vitis-idaea*, and *Linnaea borealis*. Species of graminoids (~5% cover) and forbs (~20% cover) were commonly observed and include *Calamagrostis canadensis*, *Cornus canadensis*, *Mertensia paniculata*, and *Geocaulon lividum*. Both lichen and moss were minor vegetative components. This phase had 3 observations.			

Community Pathways	
Pathway Number	Pathway Name & Description
1.3a	High-severity fire. From field observations, sites appear to typically revert back to community phase 1.5. This likely occurs due to already limited depth of organic material.
1.3b	Normal time and growth without fire. Organic material increases and permafrost migrates upward in the soil profile. Paper birch and white spruce are replaced by maturing black spruce stand. Phase 1.3 is thought to have a shorter fire return interval then phase 1.1 and a longer fire return interval then phase 1.5. A long lapse in fire would be needed for pathway 1.3b to occur. This lapse is likely longer than the typical interval between fire events in Interior Alaska, which is reported to be approximately 100 years.

Photo 1.4			
Community Phase Number:	1.4	Community Phase Name:	Dwarf birch-labrador tea-blueberry-tussock-tree regeneration-*Sphagnum* scrubland
Community Phase Narrative:			
Picea mariana and *Betula neoalaskana* were commonly observed (~10% cover) and primarily occurred in the regenerative tree stratum. Shrubs primarily occurred in the medium, low, and dwarf shrub stratums (total shrub cover ~150%). The most commonly observed shrub species are *Betula glandulosa*, *Betula nana*, *Ledum palustre* spp. *decumbens*, *Vaccinium uliginosum*, *Vaccinium*			

vitis-idaea, and *Rubus chamaemorus*. Graminoids were abundant (~80% cover) the most common being *Eriophorum vaginatum* and *Carex bigelowii*. Moss was abundant (~35% cover) and the most common being *Sphagnum*. This phase had 4 observations.

Community Pathways	
Pathway Number	Pathway Name & Description
1.4a	Normal time and growth without fire. Black spruce and paper birch mature into a forest and graminoids become less prevalent. This community is thought to result from a low-severity fire regime.

Photo 1.5			
Community Phase Number:	1.5	Community Phase Name:	Bebb willow-tree regeneration-fireweed-scouringrush-mixed moss scrubland
Community Phase Narrative:			
Picea mariana and *Betula neoalaskana* were commonly observed (~20% cover) and primarily occurred in the regenerative tree stratum. *Picea glauca* was also observed but at lower densities. Shrubs were evenly split between all shrub stratums (total shrub cover ~110%) and commonly observed species include *Salix bebbiana, Rosa acicularis, Alnus viridis* ssp. *fruticosa*, *Ledum groenlandicum, Vaccinium uliginosum, Vaccinium vitis-idaea*, and *Linnaea borealis*. Forbs were abundant (~40% cover) and species commonly observed were *Chamerion angustifolium*, *Cerastium sp*., and *Equisetum scirpoides*. Moss were abundant (~20% cover) and commonly observed species include *Ceratodon purpureus and*			

Polytrichum sp. This phase had 3 observations.

Community Pathways	
Pathway Number	Pathway Name & Description
1.5a	Normal time and growth without fire. Paper birch, black spruce, and white spruce mature into a forest. This community is thought to result from a high-severity fire regime.